

### **REMARKS**

In the Office Action<sup>1</sup> mailed November 25, 2008, the Examiner rejected claims 1, 3, and 4 under 35 U.S.C. § 103(a) as being unpatentable over Quate et al. (U.S. Patent No. 6,203,983, hereafter "Quate") in view of Washizu et al. (*Electrostatic Manipulation of DNA in Microfabricated Structures*, IEEE Trans. Ind. Appl., vol. 26, pp. 1165-1172, 1990, hereafter "Washizu"), and in further view of Wachter et al. (U.S. Patent No. 5,445,008, hereafter "Wachter"), and in further view of Daraktchiev et al. (U.S. Patent No. 6,457,360, hereafter "Daraktchiev"), and rejected claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Quate in view of Washizu, and in further view of Wachter, and in further view of Daraktchiev, and in further view of Yamamoto et al. (U.S. Patent No. 5,268,571, hereafter "Yamamoto"). Claims 1-4 remain pending and under consideration.

Applicants respectfully traverse the rejection of claims 1, 3, and 4 under 35 U.S.C. § 103(a) as being unpatentable over Quate in view of Washizu, and in further view of Wachter, and in further view of Daraktchiev.

Claim 1 recites an interaction detecting method comprising, among other things, "forming, in the reaction area, an uneven electric field concentrated at the treated surface of the cantilever; . . . [and] detecting a vibration amplitude of the cantilever by measuring a voltage of a resistor or a piezoelectric layer coupled with the cantilever," (emphasis added). Quate, Washizu, Wachter, and Daraktchiev, alone or combined, fail to teach at least forming an uneven electric field concentrated at the treated surface of

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<sup>1</sup> The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

the cantilever, and detecting a vibration amplitude of the cantilever by measuring a voltage of a resistor or a piezoelectric layer coupled with the cantilever.

The Examiner acknowledged, “Quate does not expressly teach forming an uneven electric field at the surface of immobilized oligonucleotides . . . , or detecting the vibration amplitude of the cantilever by measuring a voltage of a resistor coupled with the cantilever,” (Office Action at 4). Washizu and Daraktchiev fail to cure the deficiencies of Quate.

Washizu, on page 1166, right column, lines 47-51, discloses,

Two types of electrode shape are used, one is a parallel strip electrode with a spacing of 60  $\mu\text{m}$ , and the other is a right-angle edge-to-strip electrode, whose minimum spacing is 70  $\mu\text{m}$ . The former is intended to give a uniform field, and the latter a nonuniform field. (Emphasis added).

Accordingly, Washizu merely discloses forming a nonuniform electric field by using a right-angle edge-to-strip electrode. Washizu does not disclose that the right-angle edge-to-strip electrode, in any way, could constitute a cantilever. Therefore, even assuming the right-angle edge-to-strip electrode disclosed in Washizu could reasonably form an uneven electric field in the claimed reaction area, the uneven electric field thus formed cannot be concentrated at the treated surface of the claimed cantilever, because no cantilever is disclosed in Washizu. Accordingly, Washizu fails to teach or suggest, “forming, in the reaction area, an uneven electric field concentrated at the treated surface of the cantilever,” as recited in claim 1 (emphasis added). Washizu thus fails to cure the deficiencies of Quate.

Daraktchiev, at column 3, lines 41-43, discloses, “[b]y way of measuring the resistance of piezo resistor 2, the mechanical stress in the cantilever beam [1] is

evaluated,” (emphasis added), and at column 3, lines 64-67, discloses, “[b]y measuring the resistance of the piezo-resistor 2 over a range of applied a.c. frequencies, the resonance frequency of the system is determined,” (emphasis added). Accordingly, Daraktchiev merely discloses detecting the mechanical stress and the resonance frequency of cantilever 1 by measuring the resistance of piezo-resistor 2. Daraktchiev does not disclose detecting a vibration **amplitude** of cantilever 1 by measuring the resistance of piezo-resistor 2. Moreover, Daraktchiev, at column 3, lines 62-64, discloses, “[i]f the a.c. frequency is equal to the resonance frequency of the cantilever 1, a significant oscillation amplitude amplification takes place,” (emphasis added). Accordingly, Daraktchiev at best discloses the oscillation amplitude of cantilever 1 is amplified when the a.c. frequency applied to cantilever 1 is equal to the resonance frequency of cantilever 1. For at least the above reasons, Daraktchiev fails to teach or suggest, “detecting a vibration amplitude of the cantilever by measuring a voltage of a resistor or a piezoelectric layer coupled with the cantilever,” as recited in claim 1 (emphasis added). Daraktchiev thus fails to cure the deficiencies of Quate.

Wachter fails to cure the deficiencies of Quate, Washizu, and Daraktchiev, and the examiner does not rely upon Wachter for such a disclosure.

For at least the reasons set forth above, claim 1 distinguishes over Quate, Washizu, Wachter, and Daraktchiev.

Claims 3 and 4 depend from claim 1 and distinguish over Quate, Washizu, Wachter, and Daraktchiev at least due to their dependence.

Applicants respectfully traverse the rejection of claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Quate in view of Washizu, and in further view of Wachter, and in further view of Daraktchiev, and in further view of Yamamoto.

Claim 2 depends from claim 1. Yamamoto fails to cure the deficiencies of Quate, Washizu, Wachter, and Daraktchiev. Accordingly, claim 2 distinguishes over Quate, Washizu, Wachter, Daraktchiev, and Yamamoto.

In view of the foregoing remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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